

**ABSTRACT OF THE DISCLOSURE**

A apparatus and method for estimating a sequence of transmitted quadrature amplitude modulation (QAM)-modulated signals and space-time block coded signals using an optimal expectation-maximization (EM)-based iterative estimation algorithm in  
5 a multiple-input and multiple-output (MIMO)-orthogonal frequency division multiplexing (OFDM) mobile communication system. An initial sequence estimation value is produced on the basis of a predetermined initial value using a pilot sub-carrier contained in each of OFDM signals received by a receiving side. A normalized value of a received signal on a channel-by-channel basis is produced by a predetermined equation  
10 using orthogonality between the OFDM signals received by the receiving side. At least one subsequent sequence estimation value is produced using the initial sequence estimation value and the normalized value of the received signal on the channel-by-channel basis. If the subsequent sequence estimation value converges to a constant value after an operation of producing the subsequent sequence estimation value  
15 is iterated the predetermined number of times, the converged subsequent sequence estimation value is designated as a final sequence estimation value.